

SCH4U - VSPER Worksheet 1

Molecule	Total # of valence electrons	Lewis Structure	# of outer atoms (X)	# of lone pairs (E)	General Formula AX_mE_n	Shape	Bond Angles
SiCl ₄	Si : 4 v.e. Cl : 7 v.e. $1 \times 4 + 4 \times 7 = 32$	<pre> :Cl: :Cl-Si-Cl: :Cl:</pre>	4	0	AX ₄	tetrahedral	109.5°
CF ₄	C : 4 v.e. F : 7 v.e. $4 + 4 \times 7 = 32$	<pre> :F: :F-C-F: :F:</pre>	4	0	AX ₄	tetrahedral	109.5°
SbCl ₃	Sb : 5 v.e. Cl : 7 v.e. $5 + 3 \times 7 = 26$	<pre> :Cl: :Sb-Cl: :Cl:</pre>	3	1	AX ₃ E ₁	trigonal pyramidal	< 109.5°
OF ₂	O : 6 v.e. F : 7 v.e. $6 + 2 \times 7 = 20$	<pre> :F: :O: :F:</pre>	2	2	AX ₂ E ₂	bent	< 109.5°
CS ₂	C : 4 v.e. S : 6 v.e. $4 + 2 \times 6 = 16$	<pre> :S=C=S: : :</pre>	2	0	AX ₂	linear	180°

SO ₃	S: 6 v.e. O: 6 v.e. 6 + 3 × 6 = <u>24</u>	$\begin{array}{c} \text{:O:} \\ \\ \ddot{\text{O}} = \text{S} = \ddot{\text{O}} \end{array}$	3	0	AX ₃	trigonal planar	120°
BeCl ₂	Be: 2 v.e. Cl: 7 v.e. 2 + 2 × 7 = <u>16</u>	$\text{:}\ddot{\text{Cl}}\text{---Be---}\ddot{\text{Cl}}\text{:}$	2	0	AX ₂	linear	180
AsF ₅	As: 5 v.e. F: 7 v.e. 5 + 5 × 7 = <u>40</u>	$\begin{array}{c} \text{:F:} \\ \\ \text{:F:} \text{---} \text{As} \text{---} \text{:F:} \\ \\ \text{:F:} \end{array}$	5	0	AX ₅	trigonal bipyramidal	120° eq. 90° ax.
BrF ₃	Br: 7 v.e. F: 7 v.e. 7 + 3 × 7 = <u>28</u>	$\begin{array}{c} \text{:F:} \\ \\ \text{:F:} \text{---} \text{Br} \text{---} \text{:F:} \\ \\ \text{:F:} \end{array}$	3	2	AX ₃ E ₂	T-shaped	< 90°
CO ₃ ²⁻	C: 4 v.e. O: 6 v.e. * add 2 v.e. 4 + 3 × 6 + 2 = <u>24</u>	$\left[\begin{array}{c} \text{:O:} \\ \\ \text{:}\ddot{\text{O}}\text{---C---}\ddot{\text{O}}\text{:} \end{array} \right]^{2-}$	3	0	AX ₃	trigonal planar	120°
H ₃ O ⁺	H: 1 v.e. O: 6 v.e. * remove 1 v.e. 3 × 1 + 6 - 1 = <u>8</u>	$\left[\begin{array}{c} \text{H} \text{---} \ddot{\text{O}} \text{---} \text{H} \\ \\ \text{H} \end{array} \right]^+$	3	1	AX ₃ E ₁	bent	< 109.5°